**Before the**
**Federal Communications Commission**
**Washington, D.C. 20554**

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| In the Matter of: | ) | |
| | ) | |
| Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band | ) | GN Docket No. 12-354 |

# COMMENTS OF HARRIS CORPORATION

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## COMMENTS OF HARRIS CORPORATION

The Harris Corporation (Harris) respectfully submits Comments on the Commission's Notice of Proposed Rulemaking and Order to amend the agency's rules with regard to commercial operations in the 3550-3650 MHz band.[1] Harris greatly appreciates the opportunity to detail how a new Citizens Broadband Service in the 3550-3650 MHz band would impact the vital satellite systems and facilities operating in that spectrum. Harris supports the Commission's underlying goal of making more contiguous spectrum available for mobile and fixed wireless broadband services, but urges the Commission to adopt rules that take into consideration incumbent and priority users' provision of mission critical communications in that band.

Harris CapRock, a wholly owned subsidiary of Harris, provides critical services to major oil and gas production facilities in the Gulf of Mexico. These facilities are in deep water and are out of the reach of fiber optic or terrestrial microwave services and therefore rely on satellite services for their communications needs. Because these critical communications require higher availability than is possible from the Ku Band, and these facilities are neither mobile nor nomadic, our customers have specified the use of C-Band for the satellite communications to these facilities. The Harris CapRock Houston teleport facility provides the corresponding hub

[1] *See* In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, *Notice of Proposed Rulemaking and Order*, FCC 12-148, GN Docket No. 12-354 (rel. Dec. 12, 2012) (3.5 GHz NPRM).

for these operations as well as a considerable number of international C-Band services to similar ventures.

## I. SUMMARY

The Commission's proposal to make up to 150 MHz available for mobile broadband services through a Citizens Broadband Service (CBS) cannot be promulgated at the expense of incumbent users of the 3550-3650 MHz band, many of whom provide vital services serving critical infrastructure, the government, and the public interest at large. The Commission's proposed three-tiered licensing framework could offer more spectrum for small cell networks and spectrum sharing technologies. However, the Commission must take into consideration the efficacy of critical services already operating in the 3550-3650 MHz band and those adjacent thereto. Harris urges the Commission to augment its three-tiered licensing framework by expanding the list of communication service providers it has proposed to include in its Incumbent Access and Priority Access tiers and reexamine the impact its technical specifications will have on users of adjacent spectrum.

The primary concern for incumbent users in the 3.5 GHz and adjacent bands is the issue of interference caused by out-of-band emissions and the potential disruption of vital communications service. To that end, in addition to the inclusion of non-negotiable defense and fixed satellite service systems in the Incumbent Tier, the Commission should extend this tier to and grandfather essential C-Band teleport facilities that support industries that are critical to the public interest. The Commission should also give Priority Access to C-Band Earth Stations that provide safety-of-life applications (like VSATs used by the energy industry in the Gulf of Mexico), preserve public safety, and promote responsible stewardship of the environment.

Harris also encourages the Commission to confine mobile and itinerant users of Incumbent Access or Priority Access tiers to the 3.5-3.55 GHz Band to mitigate interference with fixed communications systems.

Further, the technical specifications of the CBS must take into consideration the harmful impact of out-of-band emissions on the incumbent users of adjacent spectrum in the 3600-4200 MHz band. The Commission should also consider recasting their radiated power regulations in terms of Equivalent Isotropically Radiated Power (EIRP), a common industry practice. Finally, the modulation scheme for the CBS live database must be highly defined to ensure that there is proper flexibility between the three tiers.

## II. THE FCC'S LICENSING FRAMEWORK SHOULD EXTEND INCUMBENT ACCESS TO ALL ESSENTIAL C-BAND TELEPORT FACILITIES AS WELL AS FEDERAL AND GRANDFATHERED FSS COMMERCIAL USERS.

In the 3.5 GHz NPRM, the Commission seeks to create a licensing framework with an Incumbent Access Tier composed of federal and grandfathered Fixed Service Satellite (FSS) commercial users that would be protected from harmful interference generated by users in lower service tiers.[2] However, to fully protect against such interference for existing critical communications services, grandfathering must be extended to vital satellite services across adjacent bands.

In its proposal, the Commission establishes incumbency for thirty-seven FSS earth stations licensed to operate in the 3600-3650 MHz portion of the band.[3] Harris strongly supports the Commission's plans to grandfather FSS commercial users in the 3600-3650 MHz portion of the band. The Commission should extend this policy to incumbent FSS facilities in the lower C-

[2] *Id.* at ¶ 65.
[3] *Id.* at ¶ 69.

Band (3650-3700 MHz) identified in the NPRM's supplemental proposal.[4] Incorporating these facilities into the Incumbent Tier is the only effective method of ensuring that interference between existing and new users is mitigated across the 150 MHz of contiguous spectrum.

In addition to the FSS earth stations chosen for the Incumbent Tier, the Commission should grandfather incumbent teleport facilities operating in the lower C Band as well. Including these teleport facilities alongside grandfathered FSS providers in the Incumbent Tier will ensure that the technical and operational rules related to the Commission's three-tiered licensing framework of Incumbent, Priority, and General Authorized access meet the goal of preserving important telecommunications and defense services in the 3.5 GHz band.[5]

Teleport facilities are providing reliable critical communications to the upstream energy industry in the city of Houston and the Gulf of Mexico. These existing facilities deserve the same consideration as Incumbent Tier users under the "grandfathering" rules as they are essential to preserving the public interest, personnel safety, and environmental stewardship. Failure to provide these facilities with incumbent status could expose them to harmful out-of-band interference that would require costly and time-intensive mitigation solutions and significantly disrupt facility performance, causing serious environmental and human health risks.

Further, while Harris supports the Commission's supplemental proposal to incorporate the 3650-3700 MHz band into the licensing framework provided an incumbency process is established to protect vital FSS facilities, the Commission must elevate the incumbency status of operations in the lower C-Band. The Commission's proposal to reclassify current licensees operating in this spectrum as General Authorized Access users, the lowest tier in terms of protection and priority use, belies the Commission's own statement that lower C-Band licensees

[4] *Id.* at ¶77-82 (Supplemental Proposal to Include the 3650-3700 MHz Band).
[5] *Id.* at ¶ 50, 53-57.

provide "a variety of *important* services to utility companies, public safety entities, businesses, and consumers."[6] This automatic reclassification of incumbent licensees ignores the vital nature of some of these licensees and the Commission's final rules should permit movement to any of the proposed tiers, including the Incumbent Tier, based on the level and type of service provided. Thus, to protect these vital services, these operations should be classified as Tier 1 incumbent users.

## III. THE COMMISSION'S PRIORITY ACCESS TIER SHOULD INCLUDE ALL "MISSION CRITICAL" C-BAND EARTH STATIONS.

Harris supports the Commission's proposal to include a Priority Access Tier as part of its licensing framework for the 3.5 GHz Band. There are a variety of "mission critical" facilities serving many industries across the country that require protection from interference caused by General Authorized Access Tier operators. In response to the Commission's broad set of questions on the scope and eligibility requirements for Priority Access users,[7] Harris urges the Commission to extend Priority Access and Priority Use Zones to vital satellite communications systems operating in the C-Band in the Gulf of Mexico.

Telecommunications systems for the energy industry in the Gulf of Mexico should qualify for Priority Access under the proposed licensing framework because they represent the kind of safety-of-life applications that the NPRM identifies as worthy of protection. Crucial very-small-aperture terminals (VSAT) operating on the C-Band deliver operational support for offshore energy production and exploration efforts. These terminals meet the Commission's proposed definition for Priority Access in that they are "facilities with an urgent need for

[6] *Id.* at ¶ 77 (emphasis added).
[7] *Id.* at ¶ 71, 73-74.

uninterrupted spectrum access to support 'mission critical' uses."[8] Assigning Priority Access protection to C-Band VSATs will protect telecommunications services critical to the safe operation of these facilities.

It is important to note that the geographic nature of these facilities makes the potential for interference with Incumbent Access users highly unlikely. These facilities also point to the idea that Priority Access devices need not be limited to indoor operations, and that expanded, outdoor operations are appropriate uses of the tier.

If these VSAT operational capabilities are harmed by interference from a lower tier, the communication to the facilities could be compromised, putting the personnel at the facilities, the sensitive environment in the Gulf of Mexico, and the public interest at risk. Alternative communications facilities, such as Ku Band VSAT, fiber optics, or terrestrial microwave, either do not provide the availability required by these facilities or are prohibitively expensive and complex to utilize.

## IV. THE COMMISSION SHOULD LIMIT MOBILE AND ITINERANT OPERATIONS BY PRIORITY ACCESS USERS TO THE 3.5 – 3.55 GHZ BAND.

The Commission must address whether mobile or itinerant uses will be permitted to operate in the Incumbent and Priority Access tiers of CBS.[9] If the Commission chooses to include mobile or itinerant use to either of these tiers, it should restrict these users to the 3.5-3.55 GHz Band so as to mitigate any potential interference with fixed Incumbent and Priority Access users.

Managing mobile and itinerant users in this lower band of contiguous spectrum will ensure that there is not a deleterious effect on the CBS due to interference. Harris foresees several

[8] *Id.* at ¶ 70.
[9] *Id.* at ¶ 72. The NPRM appears to favor a Priority Access tier that includes users that "operate primarily indoors" but leaves open the possibility that uses may be extended to "the construct of outdoor deployments." Mobile or itinerant use is not specifically mentioned but has relevance in the public safety arena.

situations that could endanger the public interest and possibly impair Incumbent or Priority Access. If this protection is not implemented, there could be cases in which a Priority Access user, such as a first responder, would be inhibited from use of the spectrum during an emergency situation. Likewise, if the Priority Access user overrides the geographic enforcement mechanism to ensure operability, FSS services could be put in jeopardy.

Harris urges the Commission to consider this allocation model as an added safety margin for frequency offset that will protect FSS from interference with mobile users. Restricting these users to the lower band will also ensure performance in the Priority Access Tier in the event a mobile or itinerant user is operating on the margins of an Exclusion Zone or an FSS station's allocated spectrum.

Because the proposed Exclusion Zones cover approximately 60% of the U.S. population, a database solution is necessary to ensure that FSS operations are not interfered with by mobile and itinerant operations. Limiting operations to this specific band ultimately protects FSS operations, public safety, and the Commission's interest in allocating the 3.5 GHz Band for both Fixed and Mobile Service.

## V. THE COMMISSION SHOULD EXAMINE THE IMPACT OF ITS TECHNICAL SPECIFICATIONS ON PRE-EXISTING SERVICES.

### *A. The Commission Must Strictly Manage Out-of-Band Emissions From the Citizens Broadband Service To Protect Communications Systems in Adjacent Bands.*

The Commission seeks comment on the impact out-of-band-emissions (OOBE) may have on adjacent operations at 3600-4200 MHz and on ways to limit OOBE from CBS systems into adjacent bands.[10] While the Commission's proposal acknowledges that OOBE may cause interference in the 3600-4200 MHz band, the NPRM does not fully recognize the technical and

[10] *Id.* at ¶¶ 136-38.

economic impact OOBE may have on FSS earth stations that receive satellite signals in this spectrum.

A strict management policy of OOBE originating from CBS systems will preserve the current performance of FSS earth stations in the 3600-4200 MHz band. A satellite system (like the aforementioned teleport facilities and VSATs) that experiences interference caused by OOBE from a terrestrial-based emitter is extremely difficult to diagnose, target, and mitigate. Re-configuring wireless equipment to operate with OOBE in the same band and at the same frequency generally leads to service disruptions and can be costly and time-consuming.

In addition to a strict OOBE management policy, Harris urges the Commission to adopt a 40 dB power limit for CBS operators to protect incumbent users in adjacent bands. The physical characteristics of the C band are such that the OOBE from terrestrial apparatus that fall directly in the FSS receive band will adversely impact earth stations receive performance from significant distance.[11] Only adequate suppression of emissions into the 3.7 to 4.2 GHz FSS band will allow incumbent users to operate in the band.

### *B. The Commission Should Base Its Radiated Power Regulations on Equivalent Isotropically Radiated Power (EIRP) Rather Than Transmitter Power.*

The Commission can further its effort to protect against harmful interference by ensuring that its radiated power regulations use EIRP. Using EIRP is a common industry practice and is employed with the ISM and UNII bands. The regulation of EIRP, as opposed to transmit power, will prevent the user market from using high gain antennas with regulatory compliant transmitters. If the wireless user community adopts high gain antennas, the probability of interference into grandfathered FSS sites can increase, as the connection of antennas to transmitters without proper engineering supervision can also result in increased probability of out

[11] Harris Corporation has experienced significant and expensive problems with spurious OOBE with the UNII and Ku Band.

of band emissions that fall in band in the 3.7 to 4.2 GHz range. Moreover, the actual transmitted energy level of the emissions will not be controlled by the regulatory processes, once again increasing the probability of interference into incumbent FSS facilities.

## VI. THE COMMISSION SHOULD ESTABLISH A HIGHLY DEFINED MODULATION SCHEME FOR ITS PROPOSED LIVE DATABASE.

The Commission proposes that a database be created to identify incumbent users entitled to interference protection, and that Citizens Broadband Service users required access to that database via integrated geo-location technology.[12] Harris supports this proposal, and submits that automated regulation of the database could fail if its maintenance is not concentrated in one provider. Harris is also confident that safeguards can be built into CBS devices to power down any device that is operating inconsistently with the device's specific authorization. These devices would be tamper resistant and forced to operate as licensed under the FCC proposed regulatory regime.

This highly defined modulation scheme will facilitate the automated management of the spectrum resources needed for successful implementation of the proposed wireless access plan. It will also allow the market to develop around a standard basic chipset, lowering the cost of terminal equipment and base station equipment. If the modulation scheme is not strongly defined, then even with establishment of effective EIRP limits, systems could be allowed with variable Power Spectral Density (PSD). If the PSD is high enough, e.g., with a very high modulation index and lower symbol rate, the interference could be above the limits that are needed to prevent interference into incumbent FSS facilities. Considering the high initial costs of developing RF and signal processing chipsets, a market where many incompatible

[12] 3.5 GHz NPRM at ¶ 96.

technological solutions compete will have a difficult time achieving critical mass. If manufacturers can develop interoperable terminals, base stations and ancillary gear, they will have less risk addressing the market.

## VII. CONCLUSION

For the foregoing reasons, Harris urges the Commission to consider its recommendations as it considers amending rules pursuant to this proceeding.

Respectfully submitted,

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